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ABSTRACT

Relationships among Philosophic Mindedness (PM) (a measure of cognitive flexibility), Intellectual Self-Confidence (ISCS), ACT English (ACT-E) and the ability to reason deductively (PCRT) were obtained for 46 female and 45 male undergraduates. ISCS and PM both correlated with total PCRT performance as well as or better than ACT-E for females. However, ACT-E was much higher correlate of total PCRT for males than either ISCS or PM. Both ISCS and PM correlated significantly (p more than .05) with ACT-E for males, but neither significantly correlated for females. (Author)

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After a long history of studying relationships between general intellectual ability and academic achievement, the educational research community has turned to more careful consideration of attitudinal (motivational) predictors. At the same time, the focus on academic achievement has shifted from recall-based instruments (knowledge domain of Bloom's taxonomy) to instruments which tap higher level reasoning processes.

Attempts to investigate school related higher level cognitive processes through use of school related achievement measures, such as GPA, and standardized tests of verbal ability, as exemplified by vocabulary knowledge, are seriously handicapped by the fact that such measures reflect unknown, complex, idiosyncratic developmental histories. As a consequence, achievement variables have typically produced weak results which are difficult to interpret. With the exception of studies relating anxiety to learning, very few studies have attempted to relate school relevant learning performance data, gathered under controlled conditions, to attitudinal measures (Mouw, 1969; Williams, 1972). However, the

relationships between reasoning capabilities or processes were obscured in such studies by the unknown contributions to performance of: a) memory capabilities; b) verbal knowledge; c) learning rate potential; and d) task related prior knowledge.

This study was designed to test theoretically predictable relationships of two recently devised attitude measures, specifically Philosophic Mindedness (Felker and Smith, 1966) and Intellectual Self-Confidence (Hiller, 1972; Kirby and Hiller, 1973), primarily with a direct measure of deductive reasoning performance skills (Paulus 1967); and secondarily with a standard measure of verbal ability (American College Test, English, ACT-E).

The Philosophic Mindedness (PM) scale employed in the present study is a shortened form of the original PM scale (Felker and Smith, 1966) designed to measure the theoretical construct described by Smith (1956). Individuals who score high on the PM scale are postulated to possess the following four characteristics: (a) freedom from psychological rigidity which primarily includes the ability to judge situations accurately and to appropriately adapt actions to the situation; (b) ability to evaluate ideas without regard to their source; (c) ability to see issues as many sided rather than two sided, and to construct a relatively large number of alternate hypotheses, explanation or viewpoints; (d) tolerance for tentativeness and suspended judgment, coupled with willingness to take action in ambiguous situations when necessary.

The Intellectual Self-Confidence Scale (ISCS) is based on the construct described below. Phenomenologically, the <u>belief</u> that one has the

capacity to succeed at tasks demanding intellectual effort is the central fact of intellectual self-confidence. Theoretically, the strength and scope of this belief is a function of the individual's reinforcement history. A history of actual or perceived success would shape a positive conviction and failure a negative self-regard. In addition, if it is assumed that success constitutes positive reinforcement, then cues associated with intellectual activity will themselves acquire reinforcing properties (i.e., become positive secondary reinforcers). Thus the successful individual will develop a liking for intellectual activity. Furthermore, since the successful individual has been reinforced for his own efforts, self-reliance will also have been shaped. In summary, according to this analysis the belief that one is intellectually capable will necessarily be accompanied by two reinforced attitudes: first, a positive regard for intellectual pursuits; and second, an attitude of self-reliance. Therefore, the construct definition for intellectual-self-confidence incorporates reference to three behavioral tendencies: 1. attraction to intellectual tasks; 2. expectation for success; and, 3. self-reliance. The items of the ISCS have been written to measure one or more of these three component tendencies.

The Paulus Conditional Reasoning Test (1967), Form Z (PCRT) is designed to assess the student's ability to utilize four basic forms of conditional reasoning, and a conditional chain, in drawing logical conclusions. The test yields 5 subscores and a total score.

METHOD

Forty-six female and 45 male undergraduates enrolled in Educational Psychology, Spring quarter, 1972, at Southern Illinois University, participated to fulfill a course requirement. The PCRT was administered during the ninth week of the quarter, and data from Ss who had previously received instruction in deductive logic were excluded from analysis. The Ss were under no time constraints and usually finished the test in about 25 minutes. The attitude scales were administered during the first class meetings, and the ACT-E scores were obtained from administrative records.

RESULTS AND CONCLUSION

Performance on the two subscales which use invalid forms of reasoning (antecedent denied and consequent affirmed, see Tables 1 and 2) was much lower than for the three subscales which use valid argument forms.

Degree of Relationship between attitude variables and reasoning scores differed for male and female students. PM was significantly correlated ($p < .05$) with total PCRT score and with 2 PCRT subscales for females but was not significantly correlated with male PCRT performance. ISCS and PCRT were significantly correlated for three subscales and the correlations were stable across sexes, differing significantly on only one PCRT subscale. The ISCS correlated most strongly with the most

difficult PCRT subscale (antecedent denied) for both sexes and this result is not attributable to greater scoring variance for this subscale.

ISCS and PM both correlated with total PCRT performance as well as or better than verbal ability (ACT-E) did for females. However, ACT was a much higher correlate of total PCRT for males than either ISCS or PM.

Both ISCS and PM correlated significantly ($p < .05$) with ACT-E for males but neither significantly correlated with ACT-E for females.

Possible bases for the obtained relationships between ISCS and deductive reasoning are: (a) low intellectual self-confidence develops because of failure experiences where such failures are due to low ability (so that ISCS would have only a correlational relationship to the criterial scores); (b) low self confidence at an intellectual task leads to reduced effort, or conversely, with high confidence the student will work to achieve the anticipated success; (c) highly confident students may tend to perceive intellectual tasks as interesting and rewarding because of a positive reinforcement history, and thus work them for the "fun of it." The present study does not permit estimation of the relative contribution of such factors.

These results provide tentative support for the construct validity of ISCS for both males and females, while support for PM was generated only by female results.

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TABLE 1
Female Results[a]

				INTERCORRELATIONS[b]							
		M	SD	1	2	3	4	5	6	7	8
1.	Intellectual Self-Confidence	108.4	13.0	1.							
2.	Philosophic Mindedness	14.5	4.3	35*							
3.	A.C.T. English	20.0	4.4	-09	21						
4.	Total Logic Test Score[c]	35.6	6.0	36*	42**	36**					
5.	Antecedent Affirmed	9.2	.9	04	08	30*	36*				
6.	Consequent Denied	13.1	3.2	-10	-04	7	13	-04			
7.	Consequent Affirmed	3.5	2.5	23	33*	18	69**	15	-51**		
8.	Antecedent Denied	2.5	3.1	37**	45**	25	68**	03	-42**	84**	
9.	Conditional Chain with Antecedent Affirmed	7.3	2.2	30*	16	25	60**	38**	10	18	05

[a] N = 46 except for A.C.T. English which has N = 41.

[b] * $p < .05$; ** $p < .01$ (two tail tests).

[c] Total Test contains 60 items; each subscale contains 10 items, except the one concerning false conclusions which contains 20 items.

TABLE 2
Male Results[a]

		M	SD	INTERCORRELATIONS[b]							
				1	2	3	4	5	6	7	8
1.	Intellectual Self-Confidence	111.3	11.3	1.							
2.	Philosophic Mindedness	13.6	4.4	16							
3.	A.C.T. English	20.1	4.0	42**	37*						
4.	Total Logic Test Score	37.6	7.3	39**	17	63**					
5.	Antecedent Affirmed	9.0	1.4	16	04	55**	58**				
6.	Consequent Denied	11.6	3.9	00	06	14	36**	15			
7.	Consequent Affirmed	4.8	2.7	32*	09	32	55**	19	-38**		
8.	Antecedent Denied	4.1	3.0	37**	08	48**	65**	21	-35*	75**	
9.	Conditional Chain with Antecedent Affirmed	8.1	2.2	30*	22	52**	75**	53**	29*	14	36*

[a] N = 45 except for A.C.T. English which has N = 35.

[b] * $p < .05$; ** $p < .01$ (two tail tests).